

# Presentation on Geospatial for National Development Programmes

24<sup>th</sup> February, 2012

by

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**At: INDIA GEOSPATIAL FORUM**

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# Road Network

**National Highways: 70,548 Km**

**State Highways: 1,31,899 Km**

**Major District Roads: 4,67,763 Km**

**Rural and Other Roads: 26,50,000**

**Total Length 33 Lakhs Kms (Approx)**

# STRETCHES UNDER GIS PILOT PROJECTS



Prepared By: Information Technology & Planning Division , NHAI

# Background

- The creation of massive highway assets with four /six laning of over 20,000 km of National Highways in last few years, has led to the challenging requirement of Timely and Effective Monitoring their construction, Maintenance of quality and Efficiency of these Highways.
- Information and Communication Technology equipped with cutting edge Space and Geospatial technologies in association with latest gadgets like GPS enabled cameras and GPS enabled video logging, sensor based monitoring etc., can gives quick solution to these issues.

## Use of Satellite Imagery : High Resolution

- High Resolution satellite Imagery could be used for
  - Exactly determining the current status of the project
  - Evaluating the progress of work
  - Detecting the amount of progress over a period of time with the help of Imagery at a time interval
  - Close monitoring of the projects

# Progress Monitoring



2004



2007



2011



2007



2011

# Change Detection



10 June 2009



10 Sep 2010

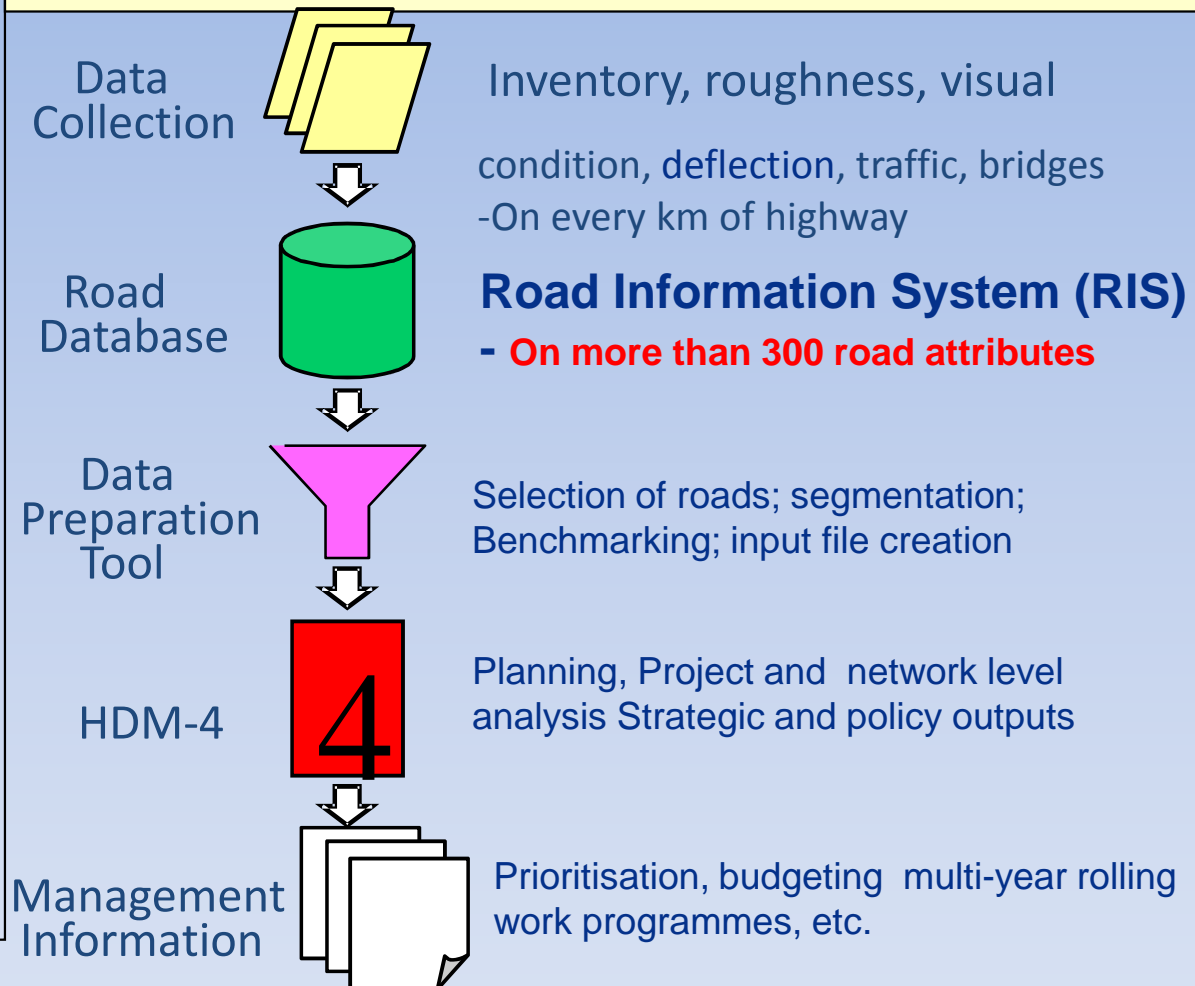


# Road Information System (RIS) - Features

## Road Information System

- Integrated system for collection and storage of highway data for Planning, Programming & Project preparation.
- Pavement & Asset Management System
- RIS Coupled with Decision support tool (HDM-4).

## RIS as a Part of Asset Management System

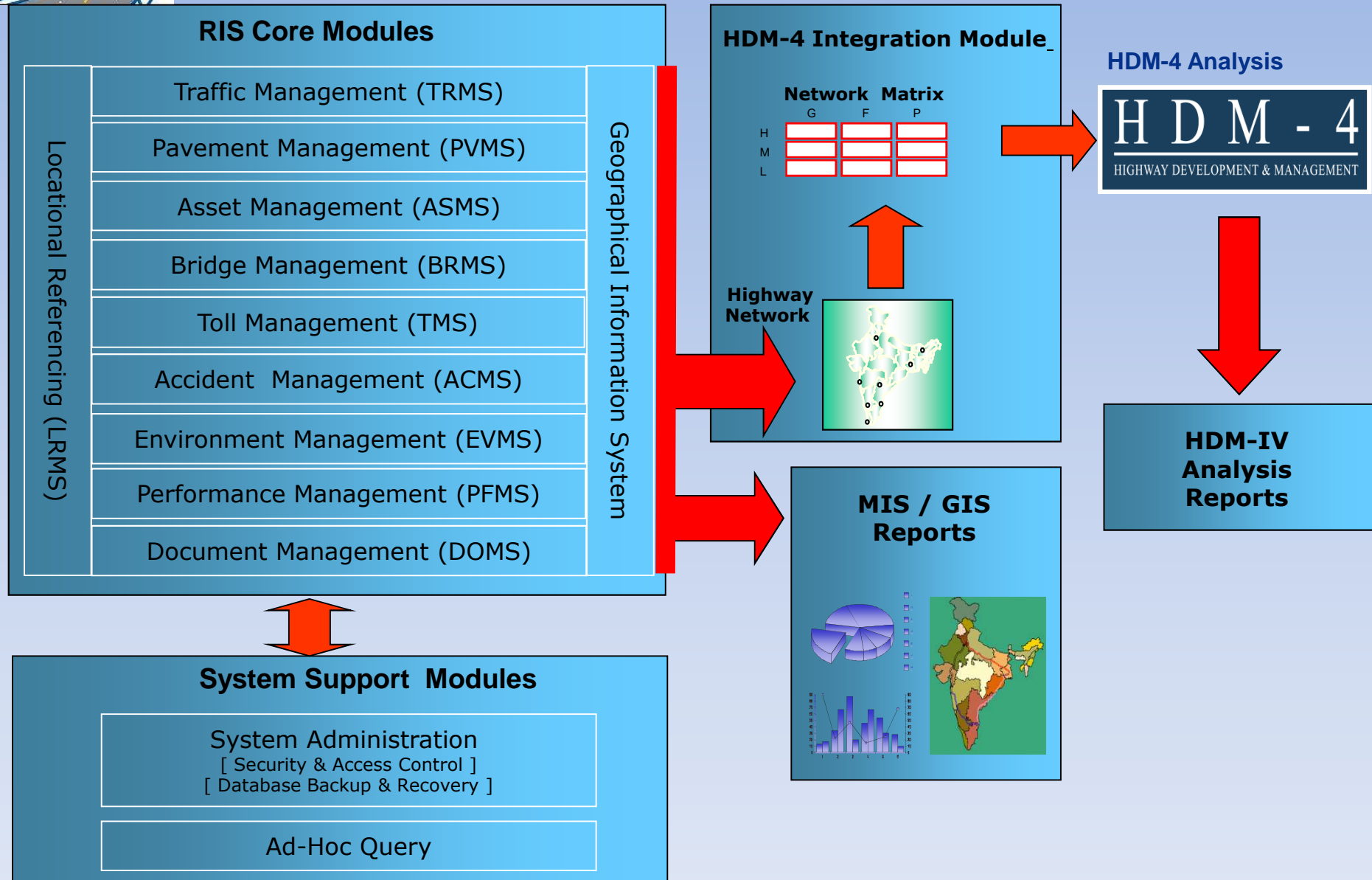


Development completed & Data populated for 11000 km NHs in June 2006 <http://www.nhai-ris.org> or <http://www.nhai.org>





# Road Information System (RIS) - System Architecture

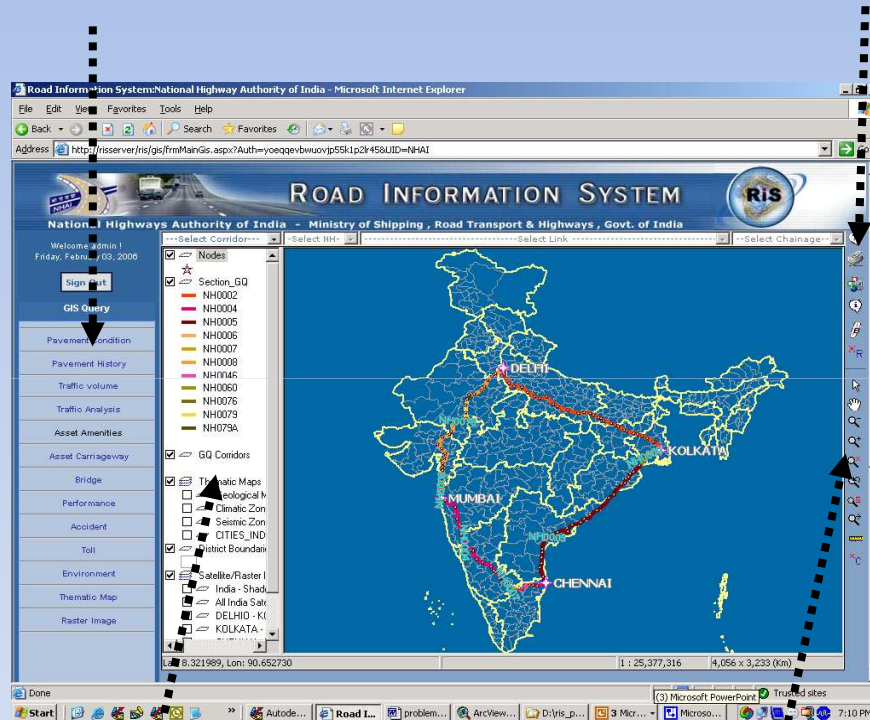




# Road Information System (RIS) - GIS Features....

Layer Control

Online help



Module Menu

Map Tool Bar

- For Querying in GIS, all attributes which would be critical for planning and maintenance of the roads are used to generate thematic maps which would be the representation of queried sections, Links and National Highway
- Following Query groups are made available as different User interfaces
  - Pavement Condition
  - Pavement History
  - Traffic Volume
  - Traffic Analysis
  - Asset Amenities
  - Asset Carriageway
  - Bridge
  - Performance
  - Accident
  - Toll
  - Environment
  - Thematic Maps and Raster Images

# Integration of RIS with ITS



Commercial vehicle Operations (CVO)



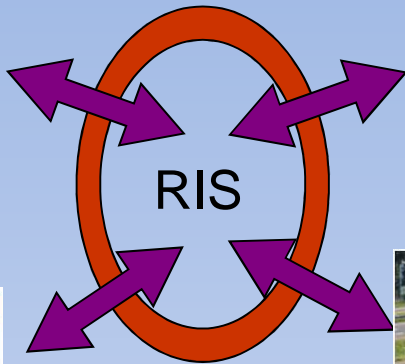
Advanced Traffic Management Systems (ATMS)



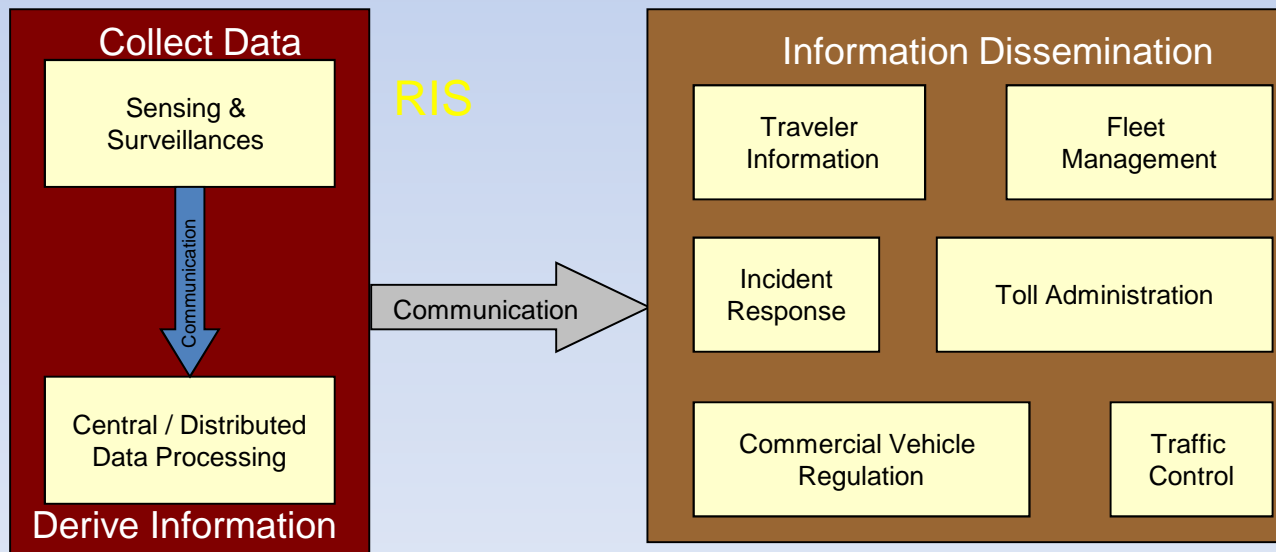
Electronic Toll Collection and Traffic Management (ETTM)



Advanced Traveler Information Systems (ATIS)



Traffic Control Centre - Belfast



# Benefits: Use of GIS and Satellite Technology

## Benefits in

- i. The projects which are in Planning, Feasibility, DPR stage i.e. the Projects yet to be awarded
- ii. The projects which are under implementation.
- iii. Design of Highways
- iv. Road Asset management.

- Better informed decision in the correct location of facilities like RUB, ROB, Flyovers, Toll Plazas, and other important structures.
- Study land acquisition problems, utility shifting, identification of encroachments, ROW violations.
- Land Use Patterns in the corridor of the NH.
- Better visualization of the ground features near the NH.
- Change detection analysis to understand the progress in any project with time series data.

# Benefits: Use of GIS and Satellite Technology

- Delineation of alternate routes and finalization of optimum route for proposed road alignments. Preparation of PPR/FR/DPR
- Land use mapping and topographic feature extraction for corridor development including identification of encroachments in ROW.
- Road Assets and amenities, Area of influence
- Coupled with the Digital Elevation model (from sources like GDEM/SRTM) of the Area where alignment is passing, the design can be refined for preparing a feasibility report.
- Satellite images can be used to see periodical development and quality of the roads (broad level construction status) by using time series data sets.
- Change can be vectorised and recorded in GIS for reporting and can be published in web by applications such as RIS.
- Design Data can be reused if these are available with GIS attributes.

## Benefits: Use of GIS and Satellite Technology

- The use of satellite images mainly for project monitoring in respect of on-going projects and for new projects for the purpose of alignment planning & fixation, correct provisioning and location of facilities like Road Under Bridge (RUB), Road Over Bridge (ROB), Flyovers, Toll Plazas and other important structures, acquisition of land, shifting of utilities, identification of forest area, encroachments, ROW violations etc. These features should be easily identified as seen on the satellite processed images of 1m resolutions from archive and as well as fresh tasking.
- Road & infrastructure Asset Management for maintaining assets details.
- Solution to provide System for monitoring project status and taking corrective actions.

## NHAI – In GIS

- NHAI aims to provide interoperable access to its geospatial data for National Highways infrastructure and enable asset and commercial information with Asset Management System to aid decision makers in forming, analyzing, monitoring and improving the current business process as well as a tool for the operational staff to increase efficiencies.
- NHAI intend to implement a GIS based On-line Monitoring and Management System of National Highways to effectively plan, monitor and manage project activities
- To monitor the progress in Highway development activities using Remote Sensing (RS) technology.

*Thank You*